Datron 4920M Alternating Voltage Measurement Standard

Operating Instructions
and
IEEE-488.2 Programming Instructions

Quick Reference Guides

STARTUP

SAFETY:	**Beware Inputs** (up to 1100V).
Line Voltage:	Ensure 4920M Line Volts Setting correct.
Line Fuse:	Ensure correct value for line voltage (115V - 1A; 230V - 500mA).
CAL Disable:	Ensure 'CALIBRATION' switch set to DISABLE.
Power Line:	Connect between 4920M and Line Supply.
Power Switch:	Press to power up.
Warm up:	Allow 30 minutes to develop full specification.

POWER-ON DEFAULT STATUS

Function: ACV **Range**: 1KV **Resolution**: 1ppm (Res7)
Filter: 100Hz **Monitor**: Off **Math**: Off

Menus: To speed operation, menus generally do not need to be closed or exited before going on to the next selection. The exception is that a hard or soft 'Quit' key is provided to exit from use of the numeric keyboard.

FUNCTIONS

ACV *User's Handbook Section 4, Page 4-4*

Low Ranges	Auto; 300mV; 1V; 3V; 10V; Up (high ranges).
High Ranges	Auto; 30V; 100V; 300V; 1kV; Down (low ranges).

ACV CONFIG *User's Handbook Section 4, Page 4-5*

Resolution	Res5 - 100ppm; Res6 - 10ppm; Res7 - 1ppm;
Filter	**Filt** (opens ACV FILT menu)

ACV FILT *User's Handbook Section 4, Page 4-5*

100Hz; 10Hz:	high pass filter selection

WBV *User's Handbook Section 4, Page 4-6*

Ranges	1V; 3V.

WBV CONFIG *User's Handbook Section 4, Page 4-7*

Resolution	Res5 - 100ppm; Res6 - 10ppm; Res7 - 1ppm;
Filter	Filt (Toggle In/Out)

FACILITIES

STATUS REPORTING

STATUS *User's Handbook Section 3, Page 3-15*

Reports active state from the following:

Function	ACV; WBV.
Range (ACV)	Auto; 300mV; 1V; 3V; 10V; 30V; 100V; 300V; 1kV
(WBV)	1V; 3V.
Filter	100Hz; 10Hz.

STATUS CONFIG *User's Handbook Section 3, Page 3-16*

Addr	Opens ADDRESS menu.
Cal?	Opens LAST CAL / CAL DUE menu.
Ser#	Opens SER# menu.

ADDRESS *User's Handbook Section 3, Page 3-17*

Shows current IEEE 488 address. The numeric keyboard is used to change the address (0-30).

Enter	Registers the displayed IEEE 488 address.
Quit	Reverts to the existing IEEE 488 address.

'Enter' or 'Quit' exits back to the STATUS CONFIG menu.

LAST CAL / DUE *User's Handbook Section 3, Page 3-18*

LAST CAL	Shows date of most-recent calibration (entered in a calibration menu on that date).
DUE	Shows when next calibration is due (calculated by summing Last Cal date with 'Cal Interval' - also entered in a calibration menu).

SER# / S/W ISS *User's Handbook Section 3, Page 3-19*

SER#	Shows instrument serial number, issue and update numbers (entered in a calibration menu).
SW/ISS	Shows software issue number (embedded in firmware and not user-alterable).

Status Menus Summary in User's Handbook: Page 3-20

FACILITIES

MONITORING

MONITOR *User's Handbook Section 4, Page 4-8*

Date	Opens DATE menu.
Dif	Opens DIF menu.
Dpc	Opens DEV (%) menu.
Dpm	Opens DEV (ppm) menu.
Freq	Opens SIGNAL FREQUENCY menu.

DATE Presents today's date/time from internal real-time calendar/clock: 'Month.Day.Year.Hour.Minute'.

DIF and DEV menus; Notes:

'Rdg' = Most-recent reading;
'Ref' = Previously assigned 'Reference' reading.
'+' = Rdg > Ref; '-' = Rdg < Ref.

'NOT VALID' appears in DIF or DEV if the input is outside the selected range, or if no reference reading has been assigned.

DIF (V) *User's Handbook Section 4, Page 4-10*

Shows difference in V (volts) between Rdg and Ref.

%	Transfers to DEV (%) menu.
Ppm	Transfers to DEV (ppm) menu.
Reset	Assigns the most-recent reading as reference.

DEV (%) *User's Handbook Section 4, Page 4-10*

Shows percentage deviation of Rdg to Ref by the formula:

Deviation = [100 (Rdg - Ref)] / Ref.

Ppm	Transfers to DEV (ppm) menu.
V	Transfers to DIF menu.
Reset	Assigns the most-recent reading as reference.

FACILITIES

MONITORING (Contd)

DEV (ppm) *User's Handbook Section 4, Page 4-11*
Shows percentage deviation of Rdg to Ref by the formula:
Formula: $[10^6 (Rdg - Ref)] / Ref$.

%	Transfers to DEV (%) menu.
V	Transfers to DIF menu.
Reset	Assigns the most-recent reading as reference.

SIGNAL FREQUENCY *User's Handbook Section 4, Page 4-9*
Shows the frequency corresponding to the RMS value shown on the main display.

MATHEMATICAL FACILITY

MATH *User's Handbook Section 4, Page 4-15*

AvR	Toggles Rolling-Average calculation - On/Off.

MATH CONFIG *User's Handbook Section 4, Page 4-15*

R	Opens R = menu for setting number of readings.

Window Size *User's Handbook Section 4, Page 4-15*

R =	Sets Rolling Average window size.
4	Averages 4 readings.
16	Averages 16 readings.
64	Averages 64 readings.

CALIBRATION FACILITIES

Refer to User's Handbook, Section 4 Page 4-19, or Section 8.

FACILITIES

TEST FACILITIES

TEST *User's Handbook Section 4, Page 4-17*

Allows selection of type of test:

Oper	Initiates Operational Test; Opens OPER TEST menu.
Diag	Initiates Diagnostic Test; Opens DIAG TEST menu.
Disp	Sets up Display Test and opens reminder screen. Repeatedly press any key except Test to send walking strobes around the main and menu display segments for visual inspection.
Keys	Sets up Keyboard Test and opens KEYBOARD TEST display. Press any key excpt Test to see key matrix position, key name and switch ident number.
Spcl	*Refer to Sevicing Handbook Section 1.*

OPER TEST display *User's Handbook Section 4, Page 4-17*

While the Operational Test is running, each test in the sequence is named on this display as it becomes current.

COMPLETE	Operational Test is successfully completed.

OPER FAIL *User's Handbook Section 4, Page 4-17*

If a test failure is discovered, the Operational Test stops and the individual test which failed is named on this menu.

Cont	After noting the failure, pressing the Cont key continues the test.

DIAG TEST display *User's Handbook Section 4, Page 4-18*

While the Diagnostic Test is running, each test in the sequence is named on this display as it becomes current.

COMPLETE	Diagnostic Test is successfully completed.

DIAG FAIL *User's Handbook Section 4, Page 4-18*

If a test failure is discovered, the Diagnostic Test stops and the individual test which failed is named on this menu.

To Exit	Press any major function key.

MENU SUMMARIES

References to User's Handbook

Function Menus Summaries:
ACV *Page 3-10*
BWV *Page 3-13*

Status Menus Summary: *Page 3-20*

Monitor Menus Summary: *Page 4-8*

Math Menus Summary: *Page 4-14*

Test Menus Summary: *Page 4-16*

Error Codes List: *Sect 4, Appendix A.*

Signal Acquisition Times: *Sect 4, Appendix B.*

Significant Range Points: *Sect 4, Appendix C.*

Calibration Menus Summary: *Page 4-20*

IEEE Command Codes: *Page 5-28...75*

Power-On Settings: *Sect 5, Appendix B.*

Error Messages: 'Error OL': Signal too large for selected range.
'Error Ur': Signal too small for selected range.

Other Messages: *Refer to User's Handbook, Appendix A to Section 4.*

IEEE-488.2 Programming Instructions

Note: *Page numbers in italics refer to the User's Handbook.*

FUNCTION AND RANGE SELECTION

ACV *(High Accuracy)* *5-28*

ACV	AUTO/0.1 to 1000	(*Examples:* ACV AUTO;
ACV	FILT_100HZ/10HZ	ACV10,FILT_100HZ,RESL7;)
ACV	RESL5/6/7	

WBV *(Extended Band)* *5-30*

WBV	≤1	1V Range
WBV	>1	3V Range
WBV	FILT_ON/FILT_OFF	(*Example:*
WBV	RESL5/6/7	WBV 3,RESL6,FILT_ON;)

TRIGGERS AND READINGS

TRIGGER CONTROL *5-32*

TRG_SRCE INT/EXT	Select trigger source.
*TRG	Execute trigger

Signal Acquisition Times *Sect. 4, Appendix B* *4-B1*

READING RETURN *5-34*

RDG?	Return RMS value of most-recent reading
FREQ?	Return frequency of most-recent reading

DIFFERENCE AND DEVIATION CALCULATIONS *5-36*

DRST	Store latest reading (Rdg) as reference (Ref)
DIF?	Return difference: Rdg - Ref (Volts)
DPC?	Return % deviation: [100 x (Rdg - Ref)] / Ref
DPM?	Return ppm deviation: [10^6 x (Rdg - Ref)] / Ref

MATH

AVG AV4/AV8/AV16 Select Rolling Average and window size.
AVG OFF Deselect Averaging.

TEST OPERATIONS

*TST?	Operational Selftest - (0 if OK, else 1).	*5-41*
DTST?	Diagnostic Selftest - (0 if OK, else 1).	*5-42*
BTST? "string"	Bus Driver Test - ("Return String").	*5-43*
RTST?	Resume interr. Selftest - (0 if OK, else 1).	*5-44*
DDQ?	Recall device errors from queue	*5-45*

ROUTINE OPERATIONAL QUERIES

*IDN?	Recall manufacturer, model number, serial number and firmware level.	*5-47*
PROG?	Return Instrument Settings in order Function, Range, Resolution, Filter, Averaging, Trig Srce.	*5-48*
DATE?	Return today's Date and Time ("mm.dd.yy.hh.MM").	*5-49*
*PUD?	Recall user entered data	*5-50*
*PSC?	Return Power On Status Clear condition (returns 1 if registers to be cleared at power on, 0 if not)	*5-51*
CALINT?	Recalls Calibration Interval (User-entered).	*5-52*
CAL_DUE?	Calculate and return Calibration Due Date	*5-53*
EXQ?	Recall latest execution error from queue	*5-54*

STATUS REPORTING

SERVICE REQUEST REGISTER

*SRE 0 to 255	Set Status Byte register enable mask	*5-56*
*SRE?	Return Enable register mask value	*5-56*
*STB?	Read Status Byte	*5-57*

STANDARD-DEFINED EVENT STATUS REGISTER

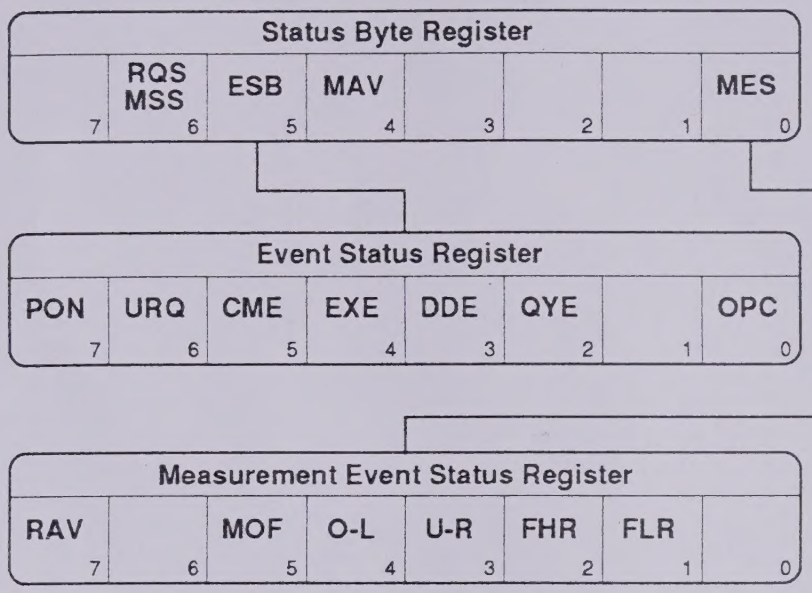
*ESE 0 to 255	Set Std ES register enable mask	*5-58*
*ESE?	Return Enable register mask value	*5-58*
*ESR?	Read Standard ES Register	*5-59*

MEASUREMENT EVENT STATUS REGISTERS

MESE 0 to 255	Set MES register enable mask	*5-60*
MESE?	Return Enable register mask value	*5-60*
MESR?	Read MES register	*5-61*

ASSOCIATED COMMANDS AND QUERIES

*CLS	Clear status	*5-61*
DDQ?	Recall device error(s) from queue	*5-45*
EXQ?	Recall execution error(s) from queue	*5-54*
*PSC 0/1	Set Power On Status Clear condition ('1' if registers are to be cleared at power on: - no SRQ at power on. '0' if registers are not to be cleared at power on: - SRQ generated at power on)	*5-62*
*PSC?	Return Power On Status Clear condition (returns 1 if registers are to be cleared at power on, 0 if not)	*5-51*


Status Byte Register
RQS MSS
ESB
MAV
MES
7 6 5 4 3 2 1 0
Event Status Register
PON URQ CME EXE DDE QYE OPC
7 6 5 4 3 2 1 0
Measurement Event Status Register
RAV MOF O-L U-R FHR FLR
7 6 5 4 3 2 1 0

INTERNAL OPERATIONS

*RST	Resets instrument to Power On state	*5-38*
*OPC *OPC? *WAI	Conform to IEEE-488.2 requirements (Little relevance to 4920M as there are no parallel operations)	*5-39/40*

CALIBRATION ENABLED OPERATIONS

Refer to User's Handbook, pages 5-63 to 5-75.

MP MASTER
MA29926